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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/766,148	01/27/2004	Yoshihide Senzaki	A-70028-2/MSS/TJH (463035)	1972
32940	7590	07/13/2006	EXAMINER CAO, PHAT X	
DORSEY & WHITNEY LLP 555 CALIFORNIA STREET, SUITE 1000 SUITE 1000 SAN FRANCISCO, CA 94104			ART UNIT 2814	PAPER NUMBER

DATE MAILED: 07/13/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/766,148

Applicant(s)

SENZAKI, YOSHIHIDE

Examiner

Phat X. Cao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-12 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. The Request for Continued Examination filed on 5/2/06 is acknowledged.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Steigerwald et al (US. 6,479,404) in view of Hegde et al (US. 6,383,873).

Regarding claims 1 and 12, Steigerwald discloses a multilayer gate dielectric film (column 1, lines 61-63) comprising: a first layer formed of Zirconium oxide material (column 7, lines 57-59 and column 8, lines 5-9) having a dielectric constant k and thickness t , the zirconium oxide material having the formula of $M(x)O(y)$ (i.e., $ZrO(2)$); a second layer formed on top of the first layer, wherein the second layer is formed of zirconium silicate material (column 7, lines 57-59 and column 8, lines 5-9) having a dielectric constant lower than that of the first layer of zirconium oxide material.

Steigerwald does not disclose that the second layer has a thickness smaller than the thickness of the first layer.

However, Hegde (Fig. 5) teaches a multilayer gate dielectric film comprising: a first layer 106 formed of a metal oxide material (column 2, lines 24-34) and having a thickness of 20-80 angstroms (column 2, lines 62-65); and a second layer 108 of a metal silicate material containing metallic element (column 3, lines 21-27) and formed

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on the first layer 106, the second layer 108 having a thickness in the range of one to two atomic layers (column 4, lines 3-4). Accordingly, it would have been obvious to form the second layer having a thickness smaller than the thickness of the first layer because it is desirable to minimize the thickness of the second layer to maintain the high-k characteristics of the composite gate dielectric film, as taught by Hegde (column 3, lines 64-66).

Regarding claims 2-3, Steigerwald further discloses that the first layer of metal oxide and the second layer of metal silicate having a dielectric constant of at least about 10 (column 2, lines 51-54).

Regarding claims 4, 6-7 and 9, Steigerwald further discloses that the first layer is ZrO_2 and the second layer is $ZrSiO_4$ (column 7, lines 57-59).

Regarding claims 5 and 8, Steigerwald further discloses that the metal oxide first layer and the metal silicate second layer include more than one metal element (column 2, lines 51-57).

Regarding claims 10-11, Hegde further teaches that a first layer 106 of metal oxide having a thickness in a range of about 20-80 angstroms (column 2, lines 62-65), and the second layer 108 of metal silicate having a thickness in the range of about one to two atomic layers (column 4, lines 3-4).

Response to Arguments

4. Applicant's arguments with respect to the claimed invention have been considered but are moot in view of the new ground(s) of rejection. The new references are applied in the new ground of rejection.

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5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Phat X. Cao whose telephone number is 571-272-1703.

The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on 571-272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

PC
July 7, 2006


PHAT X. CAO
PRIMARY EXAMINER